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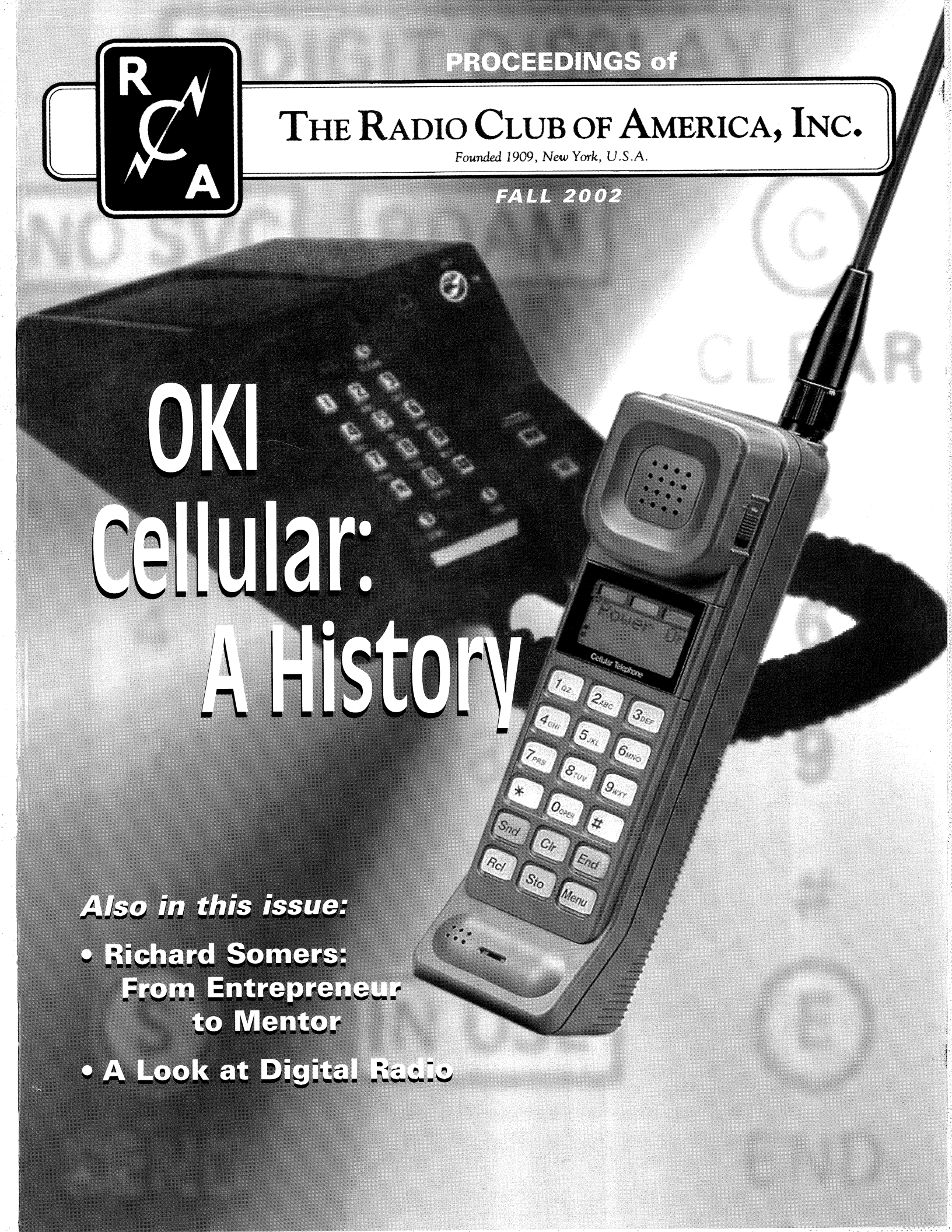

OKI Cellular: A History

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- **Richard Somers: From Entrepreneur to Mentor**
- **A Look at Digital Radio**

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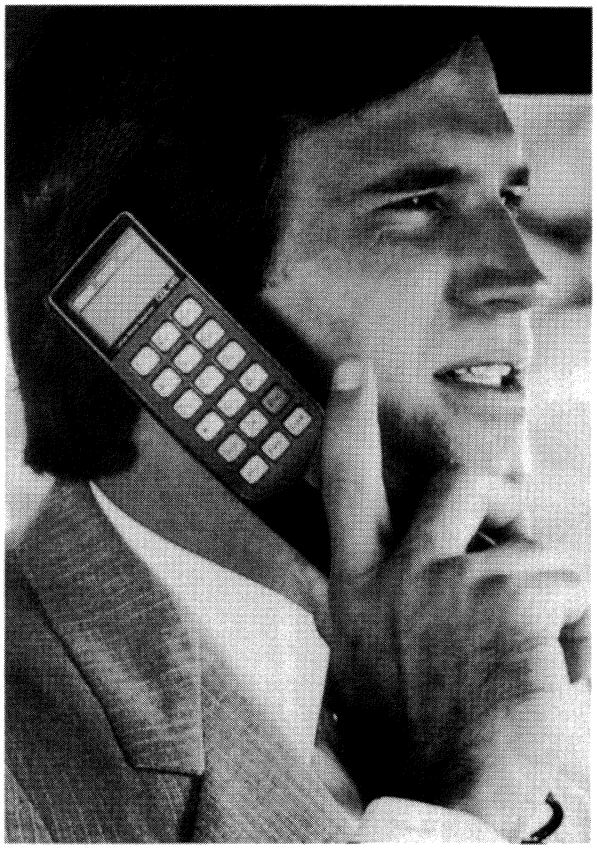

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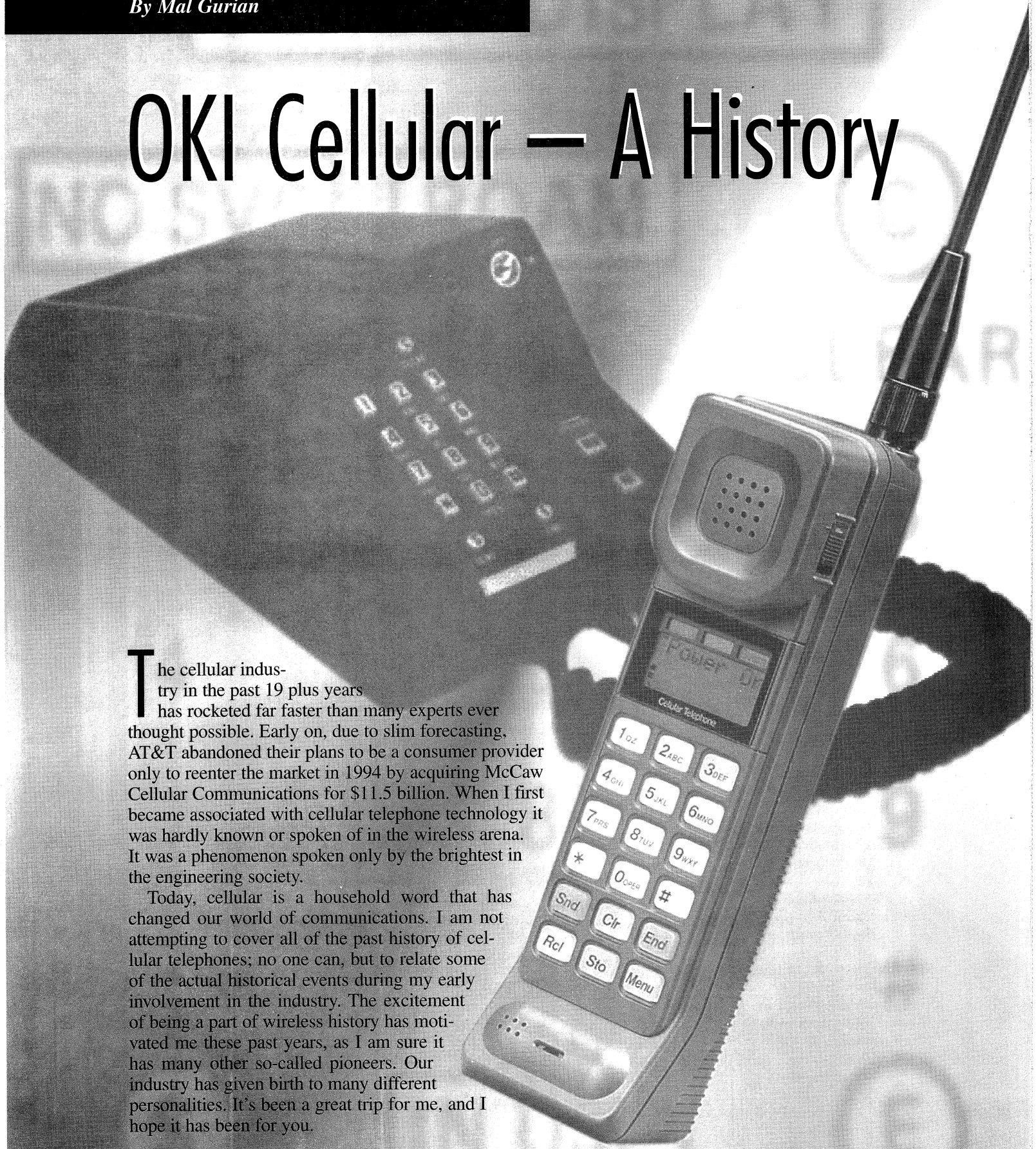
By Mal Gurian

OKI Cellular – A History



The cellular industry in the past 19 plus years has rocketed far faster than many experts ever thought possible. Early on, due to slim forecasting, AT&T abandoned their plans to be a consumer provider only to reenter the market in 1994 by acquiring McCaw Cellular Communications for $11.5 billion. When I first became associated with cellular telephone technology it was hardly known or spoken of in the wireless arena. It was a phenomenon spoken only by the brightest in the engineering society.

Today, cellular is a household word that has changed our world of communications. I am not attempting to cover all of the past history of cellular telephones; no one can, but to relate some of the actual historical events during my early involvement in the industry. The excitement of being a part of wireless history has motivated me these past years, as I am sure it has many other so-called pioneers. Our industry has given birth to many different personalities. It's been a great trip for me, and I hope it has been for you.

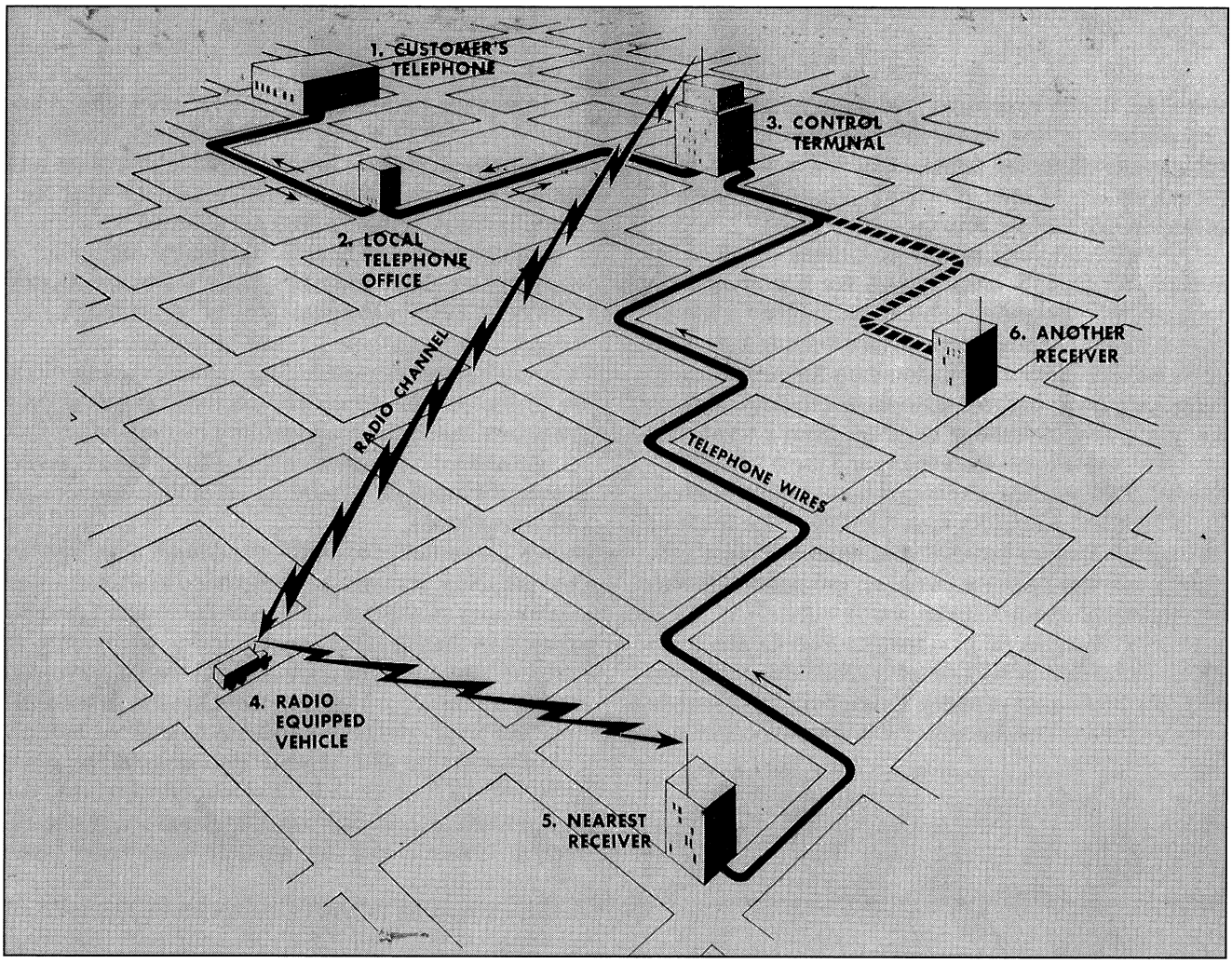


Figure 1. Diagram of conventional mobile telephone service.

The Roots

After World War II, demand for public mobile radio induced Bell Telephone Laboratories to design a service. It was 1946 when the first Bell System Mobile Service began in St. Louis on 150 MHz. In 1947 "Highway Service" began on 35 MHz and Bell proposed a 40 MHz bandwidth system. It was not until 1949 that Radio Common Carriers (RCCs) were established. At the time RCCs did not offer wireline telephone services, but did provide their subscribers with mobile radio services on different frequencies. The reason RCCs were established was to provide equal competition with the wireline carriers, i.e., the Bell System. At the time, for all practical purposes, this was accomplished. The 450 MHz band was opened for common carrier use in 1956, as a result of the consent decree with the Justice Department who prohibited the Bell System from manufacturing and operating private systems. In 1958, Bell proposed a 75 MHz bandwidth system utilizing 800 MHz and in 1964 Improved Mobile Telephone Service (IMTS) began. It was called "improved" since it did not require operator assistance.

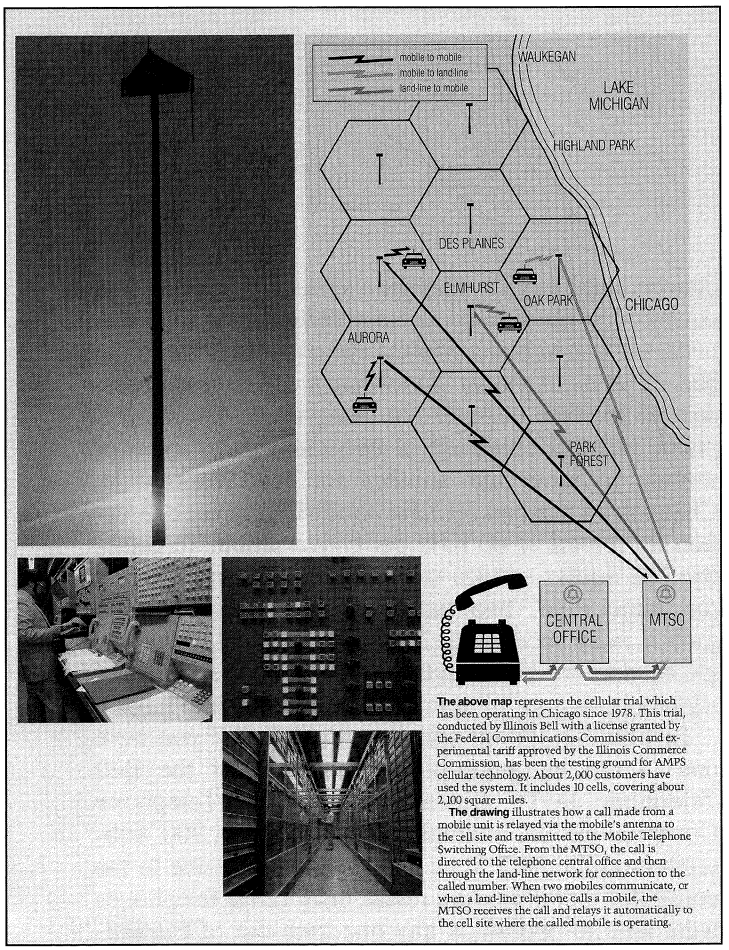
Figure 1 shows a simplified schematic diagram of a conventional mobile telephone system. A mobile was equipped with a radio transmitter/receiver that was installed in a vehicle. Mobile radiotelephones usually had 25 watts of power. To initiate a call, it was necessary to locate a channel not being used. A radiotelephone channel consisted of two radio paths, one for mobile to land and another for land to mobile. Channels in use had 30 KHz bandwidth in each direction for a total of 60 KHz per conversation. To establish full duplex service to be able to talk and listen at the same time, two paths were necessary. (Other mobile radio services such as Citizens Band, use a single channel for alternate transmission and reception of signals known as "simplex" requiring "push to talk".)

Life before cellular telephones was hell if you were one of the lucky people on any one of the Bell Telephone IMTS Systems. New York Telephone Company as an example, licensed only 700 subscribers in the New York metropolitan area due to the congested airwaves. As a result, only 12 car telephones were able to operate at any one time out of the estimated four million registered motor vehicles in the New York metropolitan area. They had to share 14 channels. In most areas where limited service was

available, it was expensive, had poor range and was very difficult getting access to a free channel. A motor vehicle closest to the transmitting tower would have the advantage of over powering others and often it became a battle of the airwaves.

During commuting hours, wait times of 10 to 30 minutes for an idle channel was not uncommon. In spite of this, potential subscribers had little or no chance of ever getting service since waiting lists were years behind. It was not uncommon for people to go out of their own state to less populated towns and cities and get mobile telephone numbers from a small privately owned telephone company and use it where they resided. This practice was illegal but loosely enforced. In 1981, there were less than 150,000, (one-tenth of one percent) motor vehicles that were equipped with mobile telephone service out of an estimated 160 million registered motor vehicles nationwide.

In 1968 the Federal Communications Commission (FCC) came out with Docket 18262 addressing the need for additional capacity throughout land mobile services. The commission in 1970 solicited comments



The above map represents the cellular trial which has been operating in Chicago since 1978. This trial, conducted by Illinois Bell with a license granted by the Federal Communications Commission and experimental tariff approved by the Illinois Commerce Commission, has been the testing ground for AMPS cellular technology. About 2,000 customers have used the system. It includes 10 cells, covering about 2,100 square miles.

The drawing illustrates how a call made from a mobile unit is relayed via the mobile's antenna to the cell site and transmitted to the Mobile Telephone Switching Office. From the MTSO, the call is directed to the telephone central office and then through the land-line network for connection to the called number. When two mobiles communicate, or when a land-line telephone calls a mobile, the MTSO receives the call and relays it automatically to the cell site where the called mobile is operating.

Figure 2. Chicago AMPS trial conducted by Illinois Bell, which included 10 cells covering 2,100 square miles. Photo property of AT&T Archives, reprinted with permission.

on a proposal to do away with UHF television channels 70 through 83 and to reassign other UHF bands so as to increase the bandwidth available to private and public mobile use. This did not go well with the television industry and they objected strongly.

In December 1971, Bell Telephone submitted a study to the FCC entitled "High Capacity Mobile Telephone System Technical Report" describing cellular technology and how it could be implemented.

In addition to demonstrating the technical feasibility of the cellular approach, the developmental program confirmed the marketability of the service and recommended standards to the FCC, which would ensure the wide compatibility of mobile units in all cellular systems.

Not commonly known, a cellular test bed in Newark, New Jersey was used which essentially was a laboratory in the field. The cellular test bed provided most of the data verifying the technical viability of cellular systems. The Newark, NJ facility evolved from a sophisticated measurement system first developed for field propagation studies conducted by Bell Laboratories in and around Philadelphia between 1970 and 1972. Nine cell sites in total were used for the Newark cellular test bed. Three main cell sites in central Newark and six satellite transmitter sites (interferer sites).

It is interesting to note at this point that in 1947 an unpublished paper by D. H. Ring of Bell Labs proposed a revolutionary concept called the cellular approach. At the time, means for administering and controlling these different calls was not available; the transistor had not been invented. It remained for electronic switching to make such control a reality.

In 1973, Oki Electric Industry Company of Japan started working with Bell Telephone Laboratories on the early design stages of a cellular mobile telephone in preparation of a positive FCC decision to further explore cellular. By 1974, the FCC allocated 40 MHz of spectrum space to the wireline companies for common carrier use. The RCCs objected to this allocation realizing their Mobile Telephone Service (MTS) would be drastically reduced. The FCC then modified their decision and opened the 40 MHz to all qualified common carriers.

Enter Cellular

In 1977, the FCC granted permits to Illinois Bell Telephone Company to construct an experimental system called the Chicago AMPS Trial. AMPS, which stood for Advanced Mobile Phone Service was authorized to install a maximum of 2,500 units. On December 20, 1978 Illinois Bell Telephone Co. put the trial system to work utilizing mobile units manufactured by Motorola, Oki and EF Johnson. Another per-

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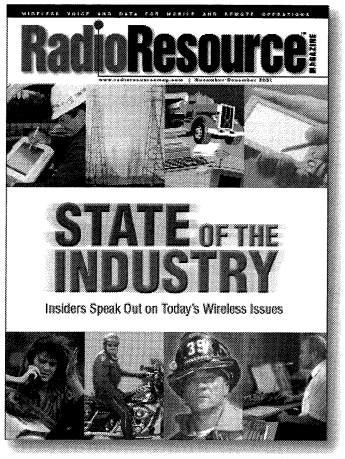

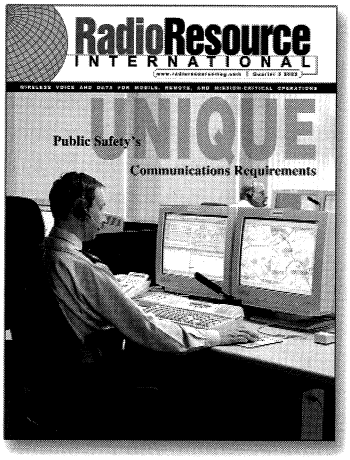

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mit was granted to Motorola for an experimental trial in Baltimore and Washington, DC.

This was designated as the ARTS trial named after American Radio Telephone Service Co. who operated the system. The ARTS system had no public customers since it was a technical trial only. Following successful demonstrations, both AMPS and ARTS proved that the cellular concept was a winner. On May 4, 1981, the FCC issued its Report and Order that generated an abundance of petitions for reconsideration and change in the rules under which cellular service could be provided. After consideration, the FCC on March 3, 1982 released its Memorandum Opinion and Order on Reconsideration. Needless to say the early days of cellular brought about thousands of petitions, filing and anguished cries from individuals and corporations alike. After a few delays, on June 7, 1982 the FCC accepted applications to provide cellular service in the 30 largest U.S. markets. Almost 200 applications were filed averaging 1,000 pages each.

Figure 2 represents the Chicago AMPS trial conducted by Illinois Bell, which included 10 cells covering 2,100 square miles. The drawing illustrates how a call made from a mobile unit is relayed via the mobile's antenna to the cell site and transmitted to the mobile telephone switching office (MTSO). From the MTSO, the call is directed to the telephone central office and then through the landline network for connection to the called number. When two mobiles communicate, or when a landline telephone calls a mobile, the MTSO receives the call and relays it automatically to the cell site where the called mobile is operating.

Figure 3 outlines the basic structure of a cellular system. The area to be served is divided into a number of relatively small regions called cells. Each cell site has radio equipment that connects a cell phone user that is located in that cell. Cells are interconnected to and controlled by a central MTSO. Each cell is connected to a central switch point by landlines. Cells are served by a relatively low power transmitter limited by FCC rules to no more than 100 watts. Cell sites are typically two to 10 miles in diameter, which is determined by signal strength in each cell site so as not to cause significant interference to the other. Frequency re-use and cell splitting are the essential features of the cellular concept.

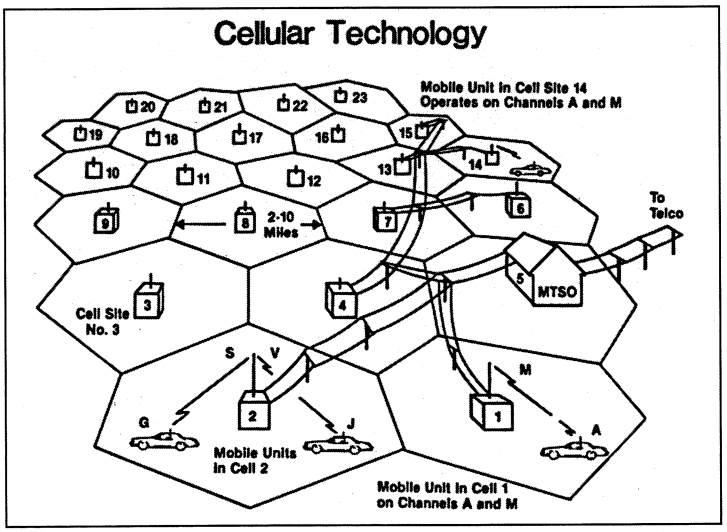
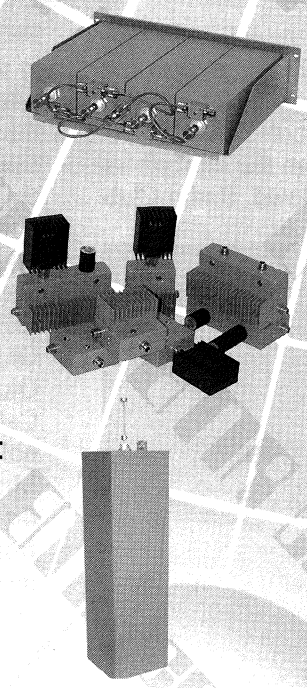


Figure 3. Diagram of basic cellular technology.

In early 1981 Oki Electric Industry Company of Japan recruited me to build and head up a new company in the United States that would be called Oki Advanced Communications. My initial visit to Tokyo was an interesting three-day maneuver. Twenty-eight different people interviewed me. Each interview moved me up to a higher person in command. Oki had spent millions of dollars over eight years on cellular development and was under pressure to succeed. I was extremely impressed when introduced to the future mobile telephone technology called cellular. At the time I was no stranger to mobile telephones having been a user on MTS and IMTS for several years while working for Aerotron, a two way radio manufacturer in Raleigh, N.C. Yes, I was one of the lucky 700 New York Telephone Company subscribers in New York City.

There are many interesting and enjoyable experiences that I will never forget from my Oki days. I worked with Tokihiko Shimomura (Shimo), vice president of the parent company in Japan who later became a member and Fellow of the Radio Club of America. We spent much time educating each other on our different countries business cultures and we became good friends. There weren't many Japanese company's entrenched in the U.S. during the 1970s. Oki was one of the first. When I joined the company, they had already been working on cellular development with Bell Labs for eight years. Bell Labs engineers spent much of their time in Japan working with Oki, and concurrently Oki had resident engineers in New Jersey working together with Bell engineers.

The first Oki cellular telephone was designated "ET" for equipment test (see Figs. 4 and 4a, pg.8). Reed Fisher (F83), James Troe (F81) and Duane Huff (F89) all Radio Club of America members, were Bell Lab Engineers that were involved in this early development of cellular technology. At completion, this phone weighed in at 80 plus pounds, comprising a logic unit and the radio/telephone unit that went into the trunk compartment of a vehicle. The control unit resembled an old Western Electric wireline telephone that was installed in the drivers' compartment weighing about five pounds. The average time to install the system into a vehicle was four hours. The model used for the Chicago trial was the "ST" which stood for service test (see Fig. 5, pg.10). It was delivered to Illinois Bell in



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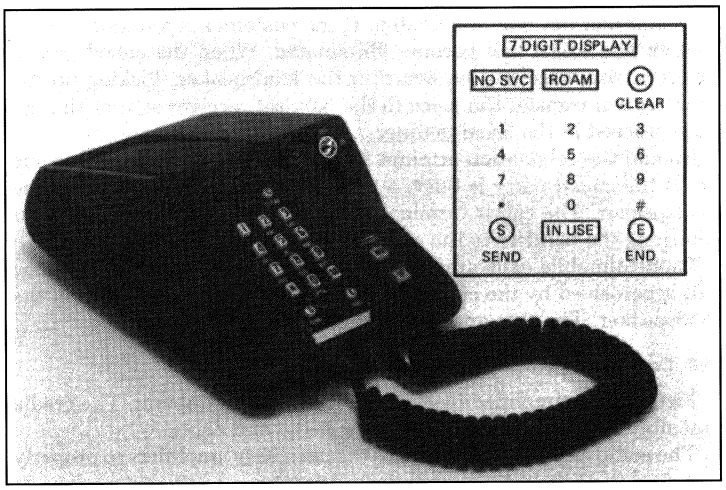
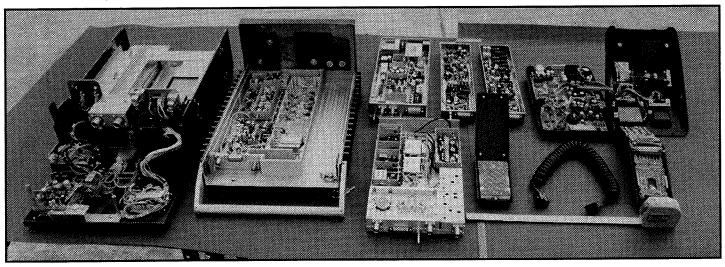
1978. It was not nearly as heavy as the ET, weighing only about 25 pounds. The cost to Illinois Bell at the time was about $2,200 per unit.

At the end of the Chicago trial, Illinois Bell mandated that all the trial units collected from the subscribers be destroyed and dumped. Jack O'Dowd, Radio Club Fellow 92' was the regional manager of the Oki facility in Elk Grove, IL. He often relates with laughter, that when the sanitation truck came to haul away the filled dumpster containing the heavy destroyed ET units, the front wheels of the truck raised off the ground when they tried to connect to the dumpster.

Figures 4. "Equipment Test" ET 3 piece Cellular Radio, Logic Unit shown here in the trunk of a 1978 Oldsmobile.



Figures 4a. "Equipment Test" ET Control Unit which would be placed in the passenger compartment of the vehicle.



Figures 4b. "Equipment Test" ET inner workings. The total weight of the entire system was 80+ lbs. All photos on this page property of AT&T archives, reprinted with permission.

My prescription for success had many roads to travel. Build a strong management team, support the product service-wise and build the Oki name that was virtually unknown in the United States. Sister companies, Okidata headquartered in New Jersey manufactures Okidata printers and Oki Semi-Conductor in California were in existence, but neither was a household name. We had only one competitor in those days, Motorola, and the name alone was intimidating. From the beginning, the Oki product won high accolades from Illinois Bell and Bell Laboratories. The ST phone just kept on talking and listening, with hardly a break down. On-going discussions with AT&T went so well, that there were serious discussions about Oki being the preferred manufacturer for them. One of the stipulations was that the equipment had to be manufactured in the United States. At that time AT&T was the only cellular wireless carrier. A professional study was executed to seek out a city to build an Oki U.S. manufacturing plant. Norcross, GA, was selected, and we were on our way. At the same time, engineers back in Japan were busy completing the company's first commercial cellular telephone, CS-1. It was a lightweight unit, at the time, only 18 pounds.

By early 1982 both my marketing and service team were operational thanks to a bunch of diligent people that worked long hours and many a night. I can remember several times when sleeping bags were utilized so as to meet our own demands of proficiency.

In mid 1983, OKI Model CS-1 sample units were sent to the FCC testing laboratory in Beltsville, MD, for type certification. Oki was either the first manufacturer to do so, or others failed testing the first or second time around, which was not unusual. Anyone having submitted equipment to the commission, knows the difficulty meeting requirements, crossing all the t's and dotting all the i's then sweating out the waiting time. It felt almost like expecting your first newborn. The CS-1 met the requirements on the first try and after a few weeks I was given a verbal OK that the units passed the grade and the formal paper work would follow in about a week. Japan was ready to start production of the early CS-1 units only awaiting that piece of paper from the FCC.

I will never forget how I coaxed Japan to begin production immediately and not to worry about written confirmation. I told them the official certification would be in the mail. I trusted that verbal conversation. As most of us know, if it's not type accepted, you can't

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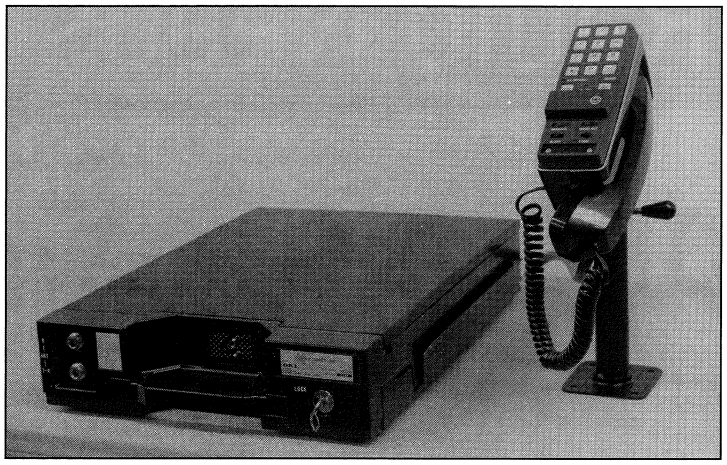

Figure 5. "System Test" ST Cellular Telephone used for Chicago AMPS Test, 25 pounds.

advertise the product or offer it for sale. Once put into production your dead in the water if the FCC finds a problem before issuing that piece of paper. I really stuck my neck out, lost some sleep, but the race was on, we all wanted so badly to be first on the street with a commercial cellular telephone, AND WE WERE. CS-1 units rolled off the fully robotic assembly line at the Honjo manufacturing plant in Japan immediately, making history. The meantime before failure on the CS-1 was 11 years. Nothing touched it in the industry. The cost of cellular phones in 1983 was as high as $3,000. By 1984, they dropped to a low of $1,395.

On September 21, 1983, Motorola announced Type Acceptance of the Dyna·TAC portable often referred to as the brick weighing over one pound. Sometime in 1984, it was made available at a cost starting at $3,995. It is important to note at this time, Marty Cooper, a Radio Club Fellow (81') is credited with inventing the cellular portable while vice president and division manager of Motorola.

The Birth of Cellular

On October 13, 1983, commercial cellular was born. This was the day we all looked forward to. Anyone that was anyone in this industry at the time was invited to Soldier Field in Chicago. It was a beautiful day and two vehicles equipped with cellular phones were on display for everyone to see and touch. William Barnett, then president of Ameritech Cellular Telephone made the first commercial cellular telephone call to the great nephew of Alexander Graham Bell who was in Germany at the time. The call was made on an Oki CS-1 cellular phone equipped with a hands free microphone that was installed in a convertible car. The first 3 fi years after commercial cellular was introduced, subscribers grew to more than 600,000. The average monthly bill in 1983 and 1984 was $150 and gradually decreased.

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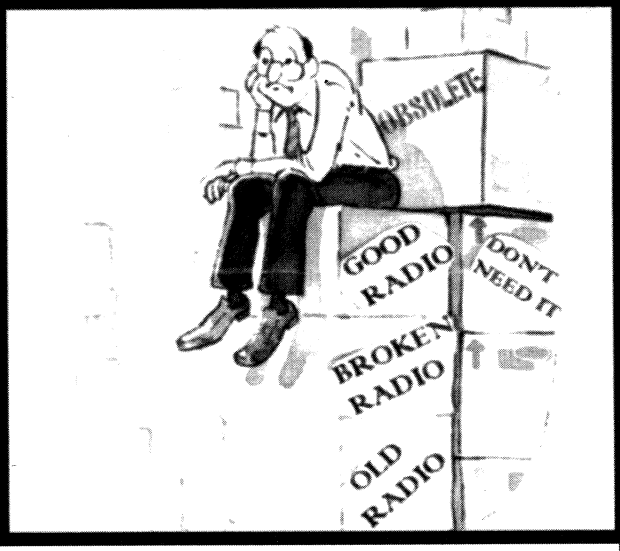

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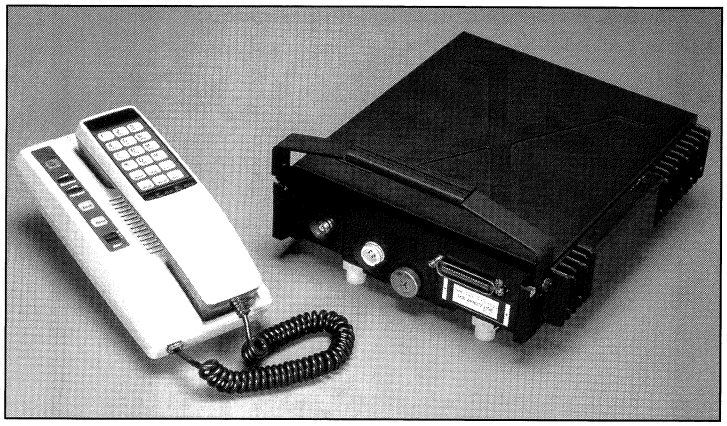

Figure 6. OKI Model CS-1 Cellular Mobile Telephone. The first unit to receive FCC type acceptance.

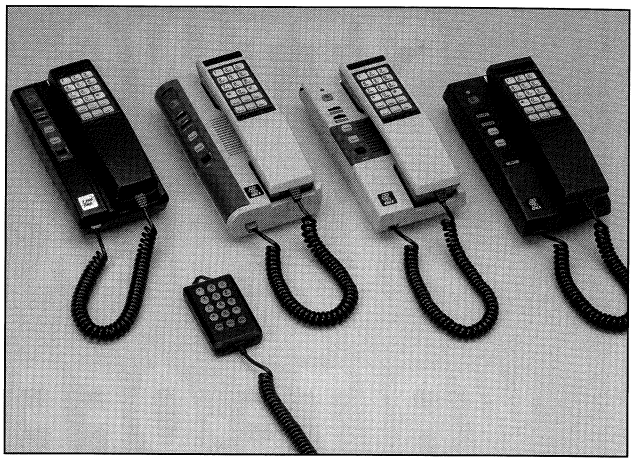

Figure 6a. OKI Model CS-1 control units.

Until divestiture on January 1, 1984, AT&T was the parent company of the Bell System, the regulated enterprise that formerly provided the bulk of telecommunications in the United States. After the break up of AT&T our team had much to do to secure new business relations with the new guys on the block. It became a whole new ballgame. The reputation that Oki earned through our engineering, product durability and field support made our job easier to become the private label manufacturer for all seven Baby Bells. What an accomplishment! Oki became the magic name in cellular. My team came through, and I was very proud.

The Norcross, GA, plant was completed in October 1985 and by all standards was the talk of the industry. It was the first fully robotic plant of its kind in the U.S. It was first built and put into operation at one of Oki's manufacturing plants located in Honjo, Japan. After working out the kinks, it was disassembled, and shipped to the United States, then reassembled in the Norcross plant. This complete operation took 23 days working 24/7 and when complete, manufacturing was transferred from Japan to Norcross. At the plant dedication, I presented the first two units off the U.S. production line to Georgia Governor Joe Frank Harris and Robert Tonsfeldt, president of Bell South Cellular.

Figure 7 shows Mal Gurian, president of OKI presenting the first and

Figure 7. Mal Gurian, president of OKI presenting the first and second FCC type accepted production units to Georgia Governor Joe Frank Harris and Robert Tonsfeldt, president of Bell South Cellular. Left to Right: Mal Gurian, Gov. Harris and Robert Tonsfeldt.

second FCC type accepted production units to Georgia Governor Joe Frank Harris and Robert Tonsfeldt, president of Bell South Cellular.

Oki went on to design the first credit card cellular telephone, transportable brief case phone and the Chrysler Motors Visor Phone (see Fig. 8). Hertz was the first car rental company that offered a cellular phone, which was manufactured by Oki. In 1985, I initiated joint venture discussions with Ake Lundqvist, (F88) president and CEO of Ericsson Radio Systems in Sweden. At the time Ericsson did not manufacture a cellular mobile unit. They only made the mobile telephone

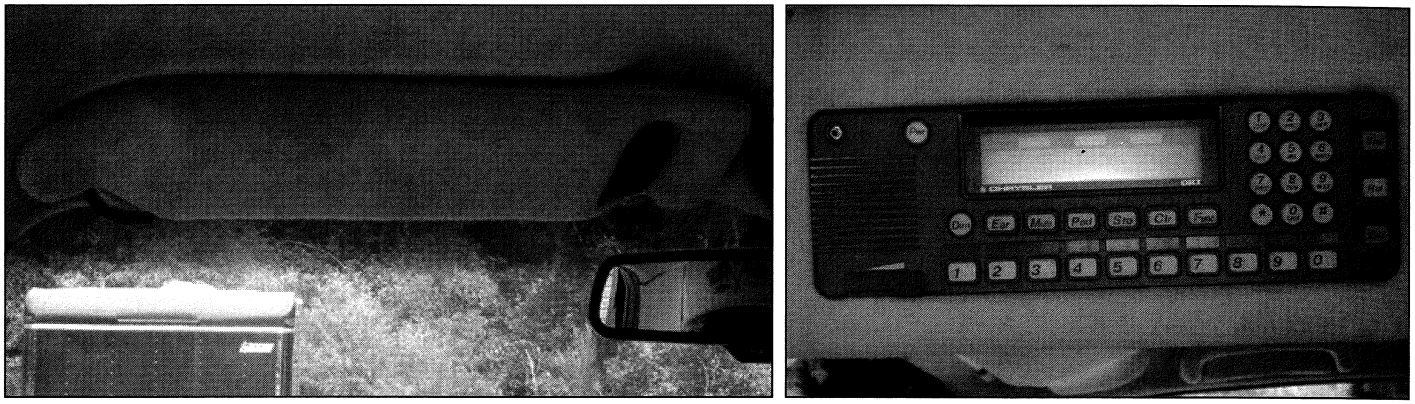

Figure 8. OKI Visor Phone developed for Chrysler Motors.

switching office (MTSO) for cell sites. They wanted and needed mobiles at the time to be a complete supplier. Oki on the other hand, was not in the switching business. "Shimo" Shimomura, and myself thought it would be a great marriage. Talks lasted several months on two different occasions before Japan ceased discussions. I was very disappointed and still believe that the marriage could have been successful for both parties. Ericsson went on to buy GE in Lynchburg, VA. By 1987, subscriber numbers hit the one million mark.

Goodbye 3-Watt Mobile Phone

By mid 1990, the larger, more powerful mobile phone was no longer economically feasible to manufacture. Margins were slim and manufacturers were losing money on the price the carriers were willing to pay. Cell sites were being built as fast as municipal construction permits were granted. The saturation of more radio towers allowed the 6/10th of a watt portable to better communicate and portables began to make their penetration into the market. They were smaller, lighter and less expensive and required no expensive in-vehicle installation, and the manufacturers were able to realize a profit. Manufacturers throughout Asia and Europe entered the race in the United States. At the end of 2001, there were 128 million cellular subscribers creating a nationwide penetration of almost 45 percent and nearly 900 million subscribers worldwide. In June of 2002, more than 26 percent of Leap Wireless International Inc. Cricket customers reported that they

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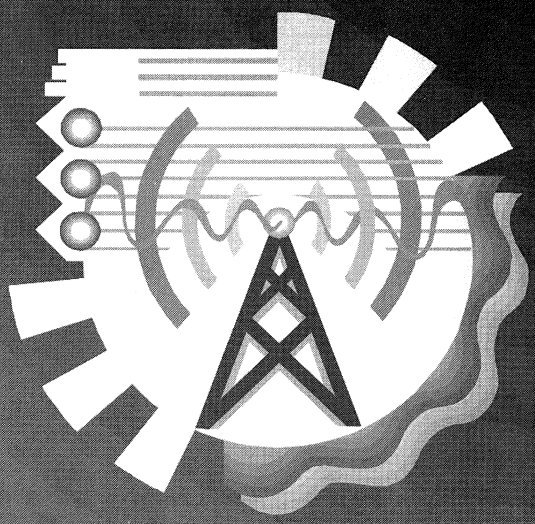

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did not have a traditional wireline phone at home. The Consumer Electronics Association (CEA) predicts 57 million handsets will be sold in the United States in year 2002, up from 53.4 million sold in 2001 and it is predicted by The Shosteck Group, that by the end of 2005 there will be 1.5 billion subscribers worldwide.

Radio Club Members that were Oki Cellular Pioneers: Reed Fisher (F83), Stanley Goldman (F95), Mal Gurian (F76), Roman Kikta (F00), Raymond Krause (F01), Maxine Carter Lome (F93), Jack O'Dowd (F92), David Rowan (M02), Anthony Russo (F92), Tokihiko Shimomura (F87).

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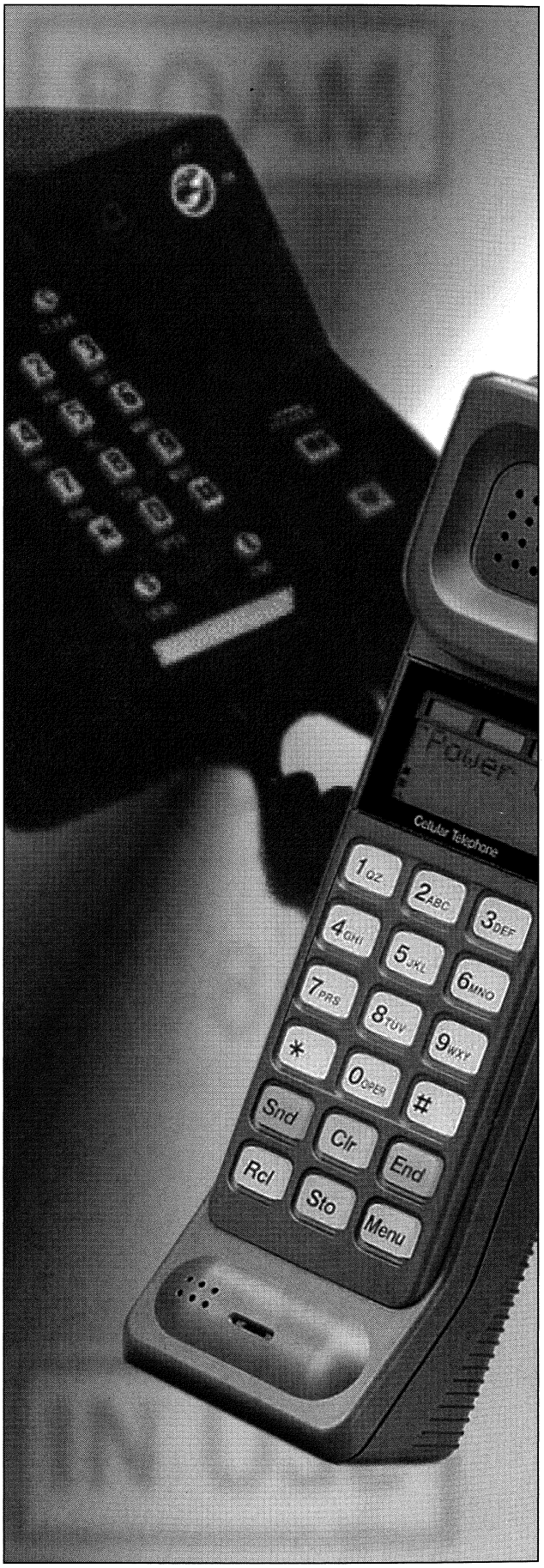

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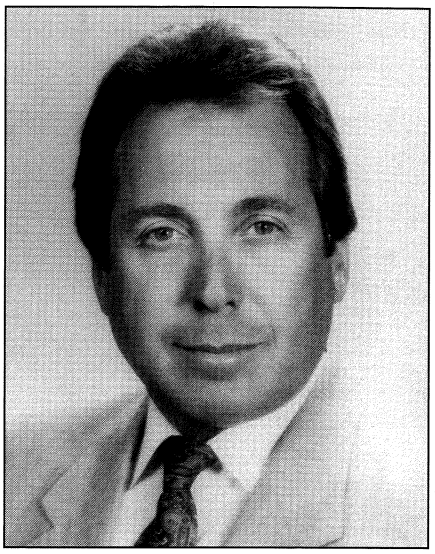
By Roger Lesser



Richard Somers: From Entrepreneur to Mentor

Everyone who has gotten into radio usually has a good story to tell. Richard Somers certainly does. "I got into it by accident," Somers says. When he was 13 he became a short-wave listener after someone bought him a short-wave radio for his birthday. The rest, as you will see, is history.

In 1949, while listening to the radio one night, he heard a large fishing boat calling for help. Somers called the Coast Guard but they had not heard anything on their radios. "I held the phone receiver up to the radio and they were able to hear what was going on," Somers says. Because of his efforts the ship and its crew were saved.

For radio historians this may have a familiar ring. Recall David Sarnoff. On April 14, 1912, Sarnoff was working at a Marconi station when he picked up message traffic from ships at sea. One of the messages was, "S.S. Titanic ran into iceberg, sinking fast." Legend has it that Sarnoff stayed at his post for 72 hours relaying messages to the New York newspapers.

Sarnoff's start on the road to success in radio can be credited to that pivotal event. The same could be said about Somers experience with the fishing vessel. While he downplays his involvement in saving the crew and vessel, the event could be credited with pushing Somers into a career in radio

After the rescue, Somers made the front page of the *Los Angles Herald,* where the newspaper incorrectly noted he had been an amateur radio operator for three years. The fact was he did not have a license. At school the next day he was laughed at because everyone knew he didn't have a license. "It got me studying day and night and within a few months I had my license and I was on the air," Somers says.

As fate would have it, not long after receiving his license, Somers and Sarnoff's paths would cross. "I had a young cousin that was about five years old," Somers says. "He had a photographic memory and I taught him the code. He became the youngest ham operator in the world." Sarnoff learned from Somers about his cousin and thought what they had done was 'terrific.'

"He gave us scholarships to attend the Don Martin School of Radio Arts and Sciences," Somers says. When they eventually met, Sarnoff mentioned to Somers that he too got his start hearing messages from a ship.

While the five year old was too young to attend, Somers and the brother of the cousin did attend. "It was an intensive summer program will all adults except for me and the brother," Somers says. After graduating Somers received his second-class license and 'learned a lot about electronics.' That was the beginning of his career.

Off to College

After graduating from high school, Somers spent two years in college working on a degree in electrical engineering. And then the doubts set in. "I wasn't sure that I wanted to make my career electrical engineering," Somers says. "So, I decided to work in the field for a couple of years and went to work for Hughes."

Somers began working with Hughes in 1957 and worked with them for about a year and half. But he quickly learned that the lack of a college degree was working against him. "There was a hierarchy at Hughes. If you didn't have at least a B.A. in electrical engineering you were considered just an hourly employee." Somers says.

After leaving Hughes, Somers went to work for the Lear Corporation. "Even though I didn't have a degree it didn't work against me," Somers notes. He became a test equipment designer and engineer. "At Lear you could go as far as you wanted," Somers says. "What mattered was what you could do." Somers says that Lear had the philosophy because Lear himself had dropped out after the eighth grade.

The Secret Room at Lear

While at Lear Somers had the opportunity to work directly with the genius that was Bill Lear. A genius who never met a clock he liked. "Lear had a secret room where he was building his jet," Somers says. "I was taken in and shown the jet and found people hanging around from Motorola. It was the middle of the night."

And the middle of the night is how Lear liked to work. "They used to have what they called Lear weekends," Somers says. "He needed young guys who could hang with him and help him out. Guys who weren't married."

Lear would start work on Friday afternoon and wouldn't go home until Monday morning. "If you wanted to sleep you slept on your desk," Somers adds. Lear was 56 at the time and Somers says that no one could keep up with him. Ken Miller, a long time member of the RCA, was chief engineer at Lear during that time and was Somers boss.

Lear eventually decided his future was with the Lear jet and prepared to move his operations to Wichita, Kansas. "I wanted no part of it. I was an L.A. boy so I decided to leave Lear and start my own company," Somers says. He notes that a number of people, including Ken Miller, tried to talk him out of it.

Lights, Camera...Radio

Somers opened a small business in Hollywood and went into the commercial side of CB radio. "This was the early days of CB before the truckers got into it," Somers says. Somers started selling CB radios to the movie studios that used them to communicate with their prop trucks and other vehicles. However, there was a problem. "They didn't have enough range so I quickly morphed into land mobile radio by buying used radio equipment from fire departments and other agencies," Somers says. "They were mostly Motorola, RCA and GE. Once I got them, I refurbished them." Somers would then resell them to the movie studios.

"The studios liked this a lot but there still wasn't enough coverage due to the mountains around L.A. and especially around the studios," Somers says. He decided it was time to expand his business interests and in doing so, he solved the studios problem. "I decided to look into putting relay stations on the mountain tops. So I did," Somers says. And in 1964 Communications Relay Corp. came into being. "It was nice having the two businesses," Somers says. "When the radio business was slow it was nice to have checks coming in from the stations."

YOUNG RADIO 'HAM' PICKS UP BOAT'S S. O. S.

Dick Somers, 13, of 1907 Garth avenue, West Los Angeles, demonstrates how he picked up S. O. S. from fishing boat, Dixie H., on his short wave radio. Boat was foundering southwest of San Diego. Coast Guard later sped to the rescue of three aboard boat. Dick has been a radio "ham" for the last three years. —Herald-Express Pho

Along Comes the FCC

Somers companies enjoyed success for a number of years until the FCC established a new form of licensing called specialized mobile radio (SMR). For the first time the owners and operators of the relay stations would become licensees of the commission. Prior to that the owners had no license since the licenses were held in the customers names in a process known as multiple licensing. "I saw this as a tremendous opportunity," Somers says.

Realizing the potential he merged Communications Relay Corp. with his major competitors in the Southern California area and formed Sigma Telecommunications in 1982. Sigma became the largest site owner and operator in California, and possibly the entire country. "We had about 35 mountain top sites and hundreds of repeater stations with thousands of customers," Somers says. "At that point I got out of the sales business entirely."

Somers and his partners had a five-year plan. The plan called for them to hold the company as is, sell the company or go public. "I saw this as a dead-end street," Somers says. Cellular was just beginning to take hold in the early 1980s and was beginning to take off. Somers realized something had to be done. "My attorney teamed up with an investment banker to roll up some of the repeater businesses in the top six major metro areas. They needed a platform on which to do this," Somers notes. At the time L.A. was considered the best growth area for radio communications. "After a year of negotiating they bought us out completely and changed the name to Fleet Call," Somers says. Fleet Call would later adopt another name - Nextel.

On to Another Startup

Following the sale of Sigma, Somers started another company called Autotel Communications

Network. "My idea was similar to the Nextel idea except I wanted to provide totally interconnected service. A combination of mobile telephones and dispatch using SMR frequencies," Somers says. Working with his accountant, who had a number of wealthy customers, Somers was able to raise a small amount of capitol. "My goal was to obtain licenses in the top 100 cities across the county," Somers notes.

"We weren't able to do that but were able to build 33 systems in 11 states." Within a few years the company was out of capitol due to recession. "At the time American Mobile Systems had gone public and the two companies merged. Somers stayed on as chief operating officer and helped the company build out a "sleeping" market - Florida. In 1995 AMS merged with Nextel and Somers retired.

The Fred Factor

While Somers may be retired he recalls his roots in radio and the fact that a number of people became his mentors. Among them was Fred Link. As an "eager young radio amateur," Somers and his high school friends decided to establish a "network" to keep in touch with each other. "We decided to do it on the six meter FM band," Somers says. "We bought up surplus WWII FM radios and I needed some information from the Link Company."

So, Somers called the Link Company. "Whoever answered the phone told me I could talk to the one man who could help," Somers says. The next thing Somers knew he was talking with Fred Link. "Fred walked me through the radios. He spent hours on the phone helping me modify the radios to make them into high powered mobiles." Because of Fred's help Somers modified the five W FM radios into 25 W radios. "All over the telephone. He was a ham and was always there to help," Somers says.

Returning Favors

Somers career and interests in radio were fostered due to men like Lear, Link and Ken Miller. Somers notes that all his success comes from his hobby - amateur radio. "Guys like Fred link would spend hours, often over the ham radio, giving guidance." Somers says. "I was a paper boy. I couldn't go to a store and buy the parts. I had to use parts from the radios. They (the mentors) were always there ready to help me." Because of them Somers is now a mentor himself. It will be interesting to see what future radio technologist or entrepreneur will recall his mentor - Richard Somers.

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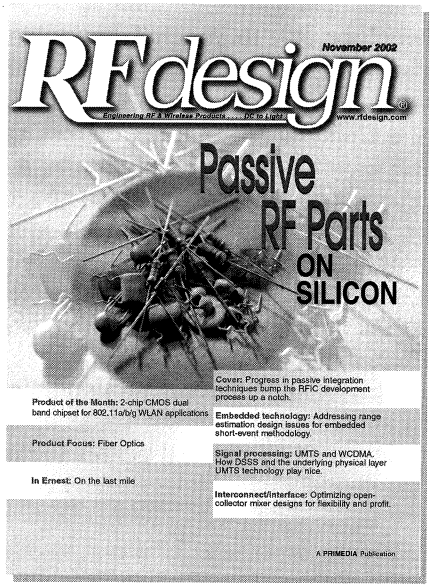

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By Sean Wargo

Digital Radio 1001

Soon you won't be able to imagine driving on a road trip without satellite radio to avoid the long lapses with that one lone station. But satellite radio is not just targeting truck drivers and traveling salespeople with 24/7 radio programs, it is focusing on the average commuter who is fed up with the lack of original programming found on many radio stations today.

And although satellite radio features crystal clear CD-quality sound and more than 100 channels coast to coast, the real differentiator from traditional radio is in the extensive and personally relevant programming. We've seen the commercials featuring some of the most creative musicians in all musical genres touting the service and the digital studios where many of the programs are recorded.

Right now two companies are offering satellite radio. XM Satellite Radio, launched in November 2001, and Sirius Satellite Radio, debuted in February. Each requires you to buy a special radio, costing from $300 to $1,000 depending on whether you get it as an option in a new car, a kit that works with your existing radio or a brand-new aftermarket car stereo from such manufacturers as Alpine, Pioneer, Kenwood and Sony, at a monthly fee of $10 to $13 a month.

XM: First out of the Gate

So far the service seems to be picking up steam. XM signed up 30,000 subscribers in its first 60 days, close to the pace in the first months of the Dish Network in 1996. By 2006, 21 million Americans will be satellite radio subscribers, estimates the Yankee Group.

XM Satellite Radio more than doubled its customers to 76,000 in the first quarter, exceeding its forecast by 6,000 subscribers and beating its target by 15 percent, surpassing analysts' expectations. That was good news for the company that has experienced a complicated rollout. The company expects to have 350,000 subscribers by the end of the year.

XM announced expanded distribution plans beyond traditional electronics retailers through nationwide retailers Sears and Radio Shack. On the product side, Sony, which offers the only "plug-and-play" XM radio for use both in the car and at home, has added 12 XM-ready car radio models for 2002. The company says that 1.5 million Sony stereos sold in 2000 and 2001 are XM-capable. Sony, Pioneer and Alpine will extend XM capability to existing car stereo owners via universal receivers that will enable any car stereo to receive XM programming.

Satellite radio is providing opportunities for the integration aftermarket. Blitzsafe announced plans to develop an inexpensive line of adapter cables that will connect an XM tuner to new and aftermarket radios. The Blitzsafe integration products promise to reduce the install time on premium vehicles with pre-wiring harnesses.

On the factory side, General Motors plans to install Delphi-Delco XM radios in more than 20 vehicles this year. Introduction of factory radios in the latter part of the year should help boost consumer awareness for the technology.

Sirius: Hot on the Heels

Sirius launched its satellite radio service in February in Denver, Houston, Phoenix and Jackson, MI. The service also delivers 100 channels of digital radio programming but charges a monthly subscription fee of $12.95. Sirius promises subscribers 60 commercial-free music channels plus 40 news, sports and entertainment channels.

Sirius has agreements to install AM/FM/Sirius radios in vehicles from Ford, Chrysler, BMW, Mercedes-Benz, Jaguar, Volvo, Mazda, Dodge and Jeep. On the aftermarket side, Sirius licensees include Kenwood, Panasonic, Clarion and Jensen, which have announced both dedicated radios and models that can adapt existing stereos to receive Sirius signals. Jensen showed the first portable digital satellite radio boom box at the international CES with plans for delivery late in the year.

Both companies need to amass subscriber bases in the hundreds of thousands this year in order to stay afloat, according to a report by The Yankee Group. But both XM Satellite Radio and Sirius Satellite Radio face steep costs in a challenging economy. Analysts projected in the beginning of the year that XM needed 4.3 million subscribers by 2005 to be profitable and that Sirius would need 3.4 million.

Terrestrial: Ready to Roll

Radio's response is the same old thing, only better. After ten years of development, an industry-backed outfit called Ibiquity Digital is about to begin enabling

CD-quality digital broadcasts alongside today's analog transmission. For an extra $100, you'll be able to buy a radio for the car or home from Kenwood or Harmon that receives both digital and analog AM/FM without a monthly subscription fee. All 13,000 AM/FM stations will be digital by 2017, estimates CIBC.

Digital radio is due to launch this year in Chicago, Los Angeles, Miami, New York, San Francisco and Seattle. iBiquity, the developer and licenser of digital AM and FM radio broadcast technology in the U.S, chose those markets for audience size and potential for receiver sales with the intent of quickly establishing the critical mass necessary for widespread adoption of digital AM and FM broadcasting technology in the face of largely commercial-free satellite radio programming. The second wave will occur early in 2003 in Atlanta, Boston, Dallas, Denver, and Detroit, coinciding with the commercial introduction of IBOC receivers.

The initial rollout of AM and FM digital radio will provide higher audio quality, improved reception and the potential for new, free services to listeners. Broadcasters will use the current radio spectrum to transmit AM and FM analog simultaneously with new higher quality digital signals. Digital radio will be free of the static, hiss, pops and fades caused by multipath, noise and interference in analog radio.

iBiquity Digital's FM IBOC system was endorsed by The National Radio Systems Committee (NRSC), jointly sponsored by the National Association of Broadcasters (NAB) and the Comsumer Electronics Association (CEA). The endorsement clears the way for broadcasters and manufacturers to begin converting stations to IBOC digital broadcasting. The FCC's approval of the system would be "charting the course for an efficient transition to digital broadcasting with minimal impact on existing analog FM operation and no new spectrum requirements," according to the committee.

Broadcasters supporting the launch of in-band on-channel (IBOC) technology this year include ABC Radio, Bonneville International Corporation, Beasley Broadcast Group, Clear Channel Communications, Cox Radio, Entercom, Hispanic Broadcasting, Infinity Broadcasting and Susquehanna.

OEM automotive supplier Visteon announced at CES that it would integrate iBiquity's IBOC technology into model 2004 receivers, and Ford Motor Co. became an investor in iBiquity with plans to explore opportunities for installing IBOC radios in Ford vehicles. Hyundai's AutoNet plans to install IBOC radios in Hyundai and Kia vehicles in the U.S., joining Fujitsu Ten and Delphi. Blaupunkt, JVC, Kenwood, Mitsubishi, Recoton, Sanyo and Alpine are working with iBiquity on aftermarket car radios, and Harman Kardon signed on as a digital radio licensee for home tuners. The new technology finally will let AM stations, long limited by bandwidth one-tenth the size of FM, broadcast in stereo at a quality equal to that of analog FM.

Upgrade costs to stations are minor, about $75,000 for a digital transmitter. And, because the digital signal occupies only 65 percent of the excess allotted bandwidth, stations can use the leftover spectrum to transmit text information like the artist's name, song title or more advertising. Now that Ibiquity is ready, it remains to be seen whether broadcasters will jump in. XM and Sirius burned up nearly $1 billion apiece in their decade-long quest to get into orbit.If they fail, radio operators could be content to stick with analog.

Future

Given the compelling mix of features and strong industry support, it is hard to imagine that satellite radio will not succeed. However with an increasing number of subscription services to participate in, the addition of another service may be more than consumers are willing to handle. However, the desire for high quality news, music, sports and news programming may win in the end. Soon, consumers may demand 24/7 programming wherever they are, be it at home or on the road.

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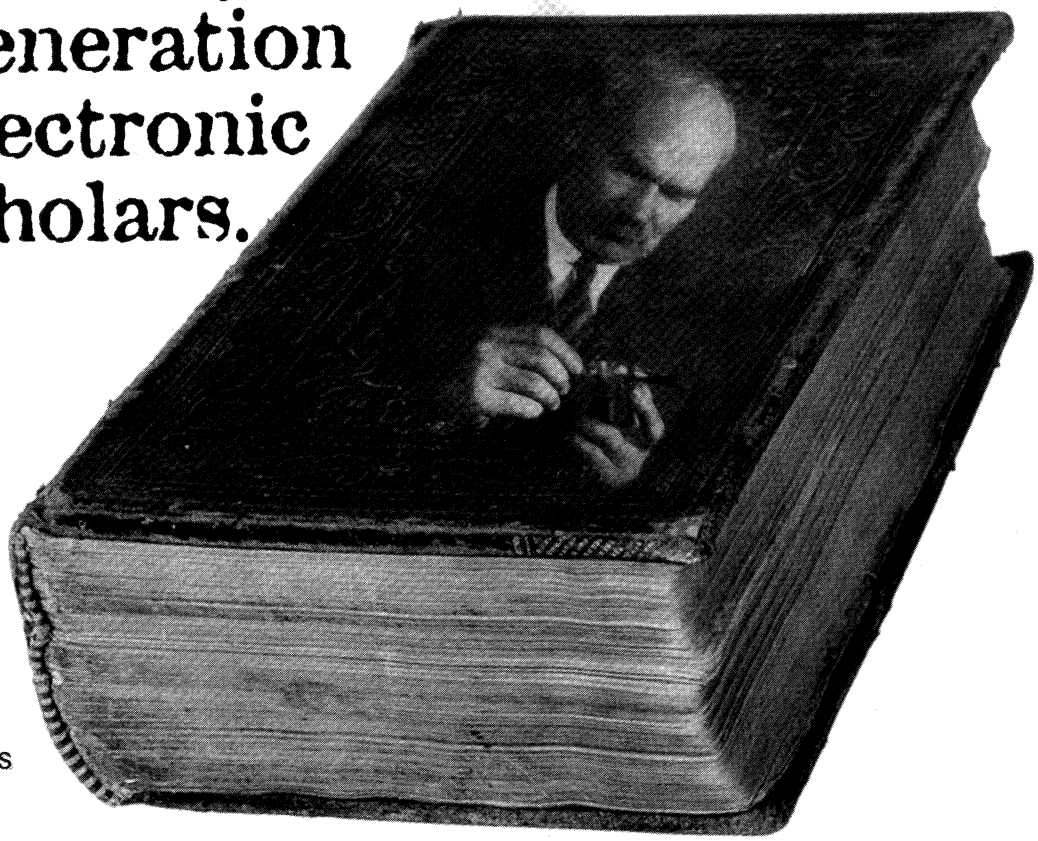

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Email: *jeff.penteris@andrew.com*

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Ron Haraseth, APCO AFC Director
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Daytona Beech, FL 32114-1112
Phone: (386) 322-2500, *ext. 2461*
Fax: (386) 322-2502
Cell: (386) 235-3528
Email: *harasethr@apco911.com*
Web Site: www.apco911.com

ASSOCIATION OF PUBLIC-SAFETY COMMUNICATIONS OFFICIALS

SOFTWARE T.Q.M.

Paul A. Willis, P.E.

PO Box 456
Altadena, CA 91003-0456
Phone/Fax: (626) 791-0809
Email: *swtqm@aol.com*

RESCUING SOFTWARE DEVELOPMENT PROJECTS, CUSTOM SOFTWARE DEVELOPMENT

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Manuel Alvarez Sr., President
2200 N.W. 102 Ave., Unit #3
Miami, FL 33172
Phone: (305) 477-2326
Fax: (305) 477-6351
Email: *mannysr@beamradio.com*
Web Site: www.beamradio.com

WIRELESS INFRASTRUCTURE SYSTEMS

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6015 Lohman Ford, Suite 101
Lago Vista, TX 78645
Phone: (800) 966-3357
Fax: (512) 267-7760
Cell: (512) 751-5472
Email: *dhlago@io.com*
Website: www.dhinc.com

WIRELESS COMMUNICATIONS INDUSTRY

DH MARKETING

Paul Denwalt
6015 Lohman Ford, Suite 101
Lago Vista, TX 78645
Phone: (800) 966-3357
Fax: (512) 267-7760
Cell: (405) 823-8832
Email: *dhlago@io.com*
Website: www.dhmarketing.biz

WIRELESS COMMUNICATIONS INDUSTRY

KENWOOD COMMUNICATIONS CORPORATION

Chris J. Ryg, Consumer Communications Sales Manager
3975 Johns Creek Ct.,
Suite 300
Suwanee, GA
Phone: (678) 474-4704
Fax: (678) 474-4730
Email: *cryg@kenwoodusa.com*

PARKINSON ELECTRONICS COMPANY

M.E. (Gene) Parkinson, President, CEO

1515 Houston St.
Levelland, TX 79336
Phone: (806) 894-1576
Email: *gpark@nts-online.net*

MOBILE COMMUNICATIONS

FOUNDATION FOR AMATEUR RADIO

John H. Swafford

2025 N. Kensington St.
Arlington, VA 22205
Phone: (703) 536-9537
Fax: (703) 536-5668
Email: *w4hu@juno.com*

Ad Index

The Radio Club of America, Inc.

Founded 1909

WORLDíS FIRST RADIO COMMUNICATION SOCIETY

APPLICATION FOR MEMBERSHIP

Date: _____

TO: **THE EXECUTIVE COMMITTEE**

I hereby apply for ☐ Regular ☐ Retired ☐ Student (please check one) membership in THE RADIO CLUB OF AMERICA, INC. and certify that I meet the requirement for the grade selected. I further agree that, if elected, I will be governed by the Clubís Constitution and By-Laws as long as I continue to be a Member.

_____
Signature

Full Name: _____
(LAST) (FIRST) (INITIAL) (CURRENT AMATEUR CALL)

Home: _____
(STREET) (The above information is used for mailings and your membership directory listing)

_____
(CITY) (STATE) (ZIP CODE)

_____
(PHONE) (FAX) (EMAIL)

Business: _____
(ORGANIZATION) (DIVISION)

_____
(STREET) (CITY) (STATE) (ZIP CODE)

_____
(PHONE) (EXT.) (FAX) (EMAIL)

Birthplace: _____ Date of Birth: _____

Education and memberships in other clubs and societies: _____

_____

Present occupation _____

Previous experience, indicate approximate dates (a current resume may be attached to the application):

_____

_____

_____

In what particular branch of the communications art are you most interested? _____

In what year did you become interested in electronic communications? _____

Please list the name of a member to whom you are personally known and who will sponsor you.

Sponsor (optional): _____

Mail this application with the applicable TOTAL DUE AT INITIATION as indicated on the reverse of this form to:
The Radio Club of America, Inc., 244 Broad Street, Red Bank, NJ 07701
732-842-5070▪Fax 732-219-1938▪Emails: exsec@radio-club-of-america.org [or] info@radio-club-of-america.org▪Website: www.radio-club-of-america.org

The Radio Club of America was founded in 1909 by a group of the industryís pioneers, and is the first active electronics organization in the world. Its roster of members is a worldwide Whoís Who that includes many who founded and built the radio industry.

The Clubís objectives include promoting cooperation among individuals interested in electronic communications and in preserving its history. The Club administers its own Grants-In-Aid fund to provide educational scholarships from tax-deductible contributions of the Clubís members and business organizations.

The Club publishes and distributes its *PROCEEDINGS* twice a year.

ENTRANCE FEE AND DUES

Membership Category	Annual Dues Rate	3-Year Dues Rate	Initiation Fee	***Total Due At Initiation**
Regular	$40	$110	$40	**$150 (Includes 3-yrís dues)**
Retired	$25	$ 60	$25	**$ 85 (Includes 3-yrís dues)**
Student	$15	n/a	$ 7	**$ 22 (Includes 1-yrís dues)**

REGULAR member is a member not qualified for **RETIRED** or **STUDENT** status

RETIRED member is at least 65 years of age and fully retired.

STUDENT member is a full-time student at an accredited academic institution.

*For Non-U.S. Mailing Address please add $45 surcharge ($15 per year of dues) to Total Due At Initiation

☐ Check enclosed ☐ International Money Order enclosed ☐ Travelerís Check enclosed ☐ Credit Card

Visa M/C Amex Card number _____ Exp. date _____ Amt. $_____

Signature _____ Billing address for credit card _____

_____

(The charge will appear on your statement as Meredith & Hopkins.)

All monies to be issued in U.S. funds, drawn on an U.S. bank. International money orders and travelerís checks are accepted in U.S. funds, payable in the U.S. Checks should be made payable to **The Radio Club of America, Inc**

Recommendation of sponsor: (optional)

_____

_____

_____

_____

_____

_____

Sponsor Signature: _____

Date: _____

FOR OFFICIAL USE **REV-100100)**

Date Application received: _____

Date and Amount of Dues Received: _____

Admitted to Membership: _____

Membership Certificate and Pin issued on: _____

The Radio Club of America, Inc.

Founded 1909

WORLD'S FIRST RADIO COMMUNICATION SOCIETY

APPLICATION FOR SENIOR GRADE MEMBERSHIP

Date: _____

TO: **THE EXECUTIVE COMMITTEE**
I hereby apply for the Grade of Senior Member of THE RADIO CLUB OF AMERICA, INC. and agree, if advanced to this level, that I will be governed by the Club's Constitution and By-Laws.

_____
Full Signature

Full Name: _____
(LAST) (FIRST) (INITIAL)

Home Address: _____
(STREET)

_____
(CITY) (STATE) (ZIP CODE)

_____
(PHONE) (FAX) (EMAIL)

PRESENT OCCUPATION

_____
(COMPANY OR ORGANIZATION NAME) (TITLE OR POSITION)

_____
(STREET) (CITY) (STATE) (ZIP CODE)

_____
(PHONE) (EXT.) (FAX) (EMAIL)

SPONSORS

Letters of recommendation are required from two or more members (any grade) for sponsorship of Grade of Senior Member. Letters must be sent by each sponsor directly to The Radio Club of America, Inc., 244 Broad Street, Red Bank, NJ 07701. List Sponsors below:

1. _____ 3. _____
2. _____ 4. _____
3. _____ 5. _____

Mail this application with twenty-five ($25) dollar fee to cover the cost of the Senior Grade Certificate and Pin to the address indicated below.

☐ Check enclosed ☐ International Money Order enclosed ☐ Traveler's Check enclosed ☐ Credit Card

Visa M/C Amex Card number _____ Exp. date _____ Amt. $_____

Signature _____ Billing address for credit card _____

_____

(The charge will appear on your statement as Meredith & Hopkins.)

All monies to be issued in U.S. funds, drawn on a U.S. bank. International money orders and traveler's checks are accepted in U.S. funds, payable in the U.S. Checks should be made payable to **The Radio Club of America, Inc.**

(more) ➔

The Radio Club of America, 244 Broad Street, Red Bank, NJ 07701
732-842-5070▪Fax 732-219-1938▪Emails: exsec@radio-club-of-america.org [or] info@radio-club-of-america.org▪Website: www.radio-club-of-america.org

EDUCATION

Institution	Level Achieved	Date	Field

MANAGERIAL, PROFESSIONAL AND TECHNICAL EXPERIENCE RELATING TO ELECTRONIC COMMUNICATIONS

PUBLICATIONS OF SCIENTIFIC OR PROFESSIONAL PAPERS, BOOKS OR ARTICLES RELATING TO ELECTRONIC COMMUNICATIONS

OTHER BACKGROUND RELATING TO ELECTRONIC COMMUNICATIONS

Professional Awards _____

Professional Engineer's License(s) _____

Other Professional Society Affiliations & Grade of Membership _____

Current Amateur Radio Call Sign _____

Other FCC Licenses Now or Previously Held _____

FOR OFFICIAL USE **REV-071000**

Date Application received: _____ Amount of Fee Received: _____

Date Approved by Board: _____ Certificate & Pin issued on: _____

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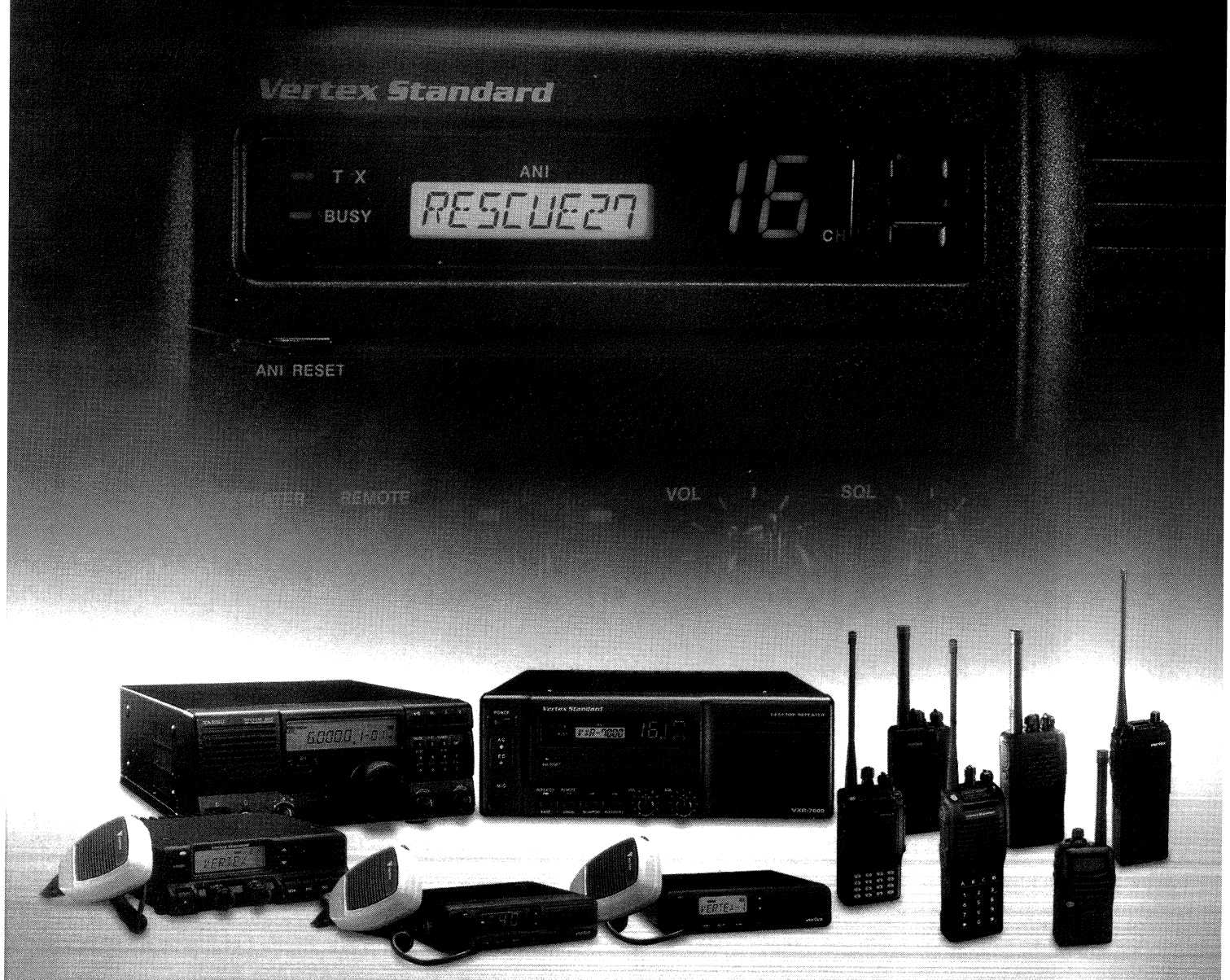

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Paul W. Mills, Vice-President